

*** Project Funded with EPA Region V TBA Funds***

**PHASE II ENVIRONMENTAL SITE ASSESSMENT REPORT
FOR THE
FORMER FULTON AUTO WRECKING PROPERTY
2300 FULTON ROAD
CLEVELAND, CUYAHOGA COUNTY, OHIO**

Prepared for
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ACRONYM LIST

amsl	Above Mean Sea Level
AOC	Area of Concern
AOCC	AOCC Group, Inc.
Auto	Automobile
bgs	Below Ground Surface
BUSTR	Bureau of Underground Storage Tank Regulations
COC	Chemical of Concern
CP	Certified Professional
DAF	Dilution Attenuation Factor
DI	Deionized
DRO	Diesel Range Organic
EDR	Environmental Data Resources, Inc.
EM	Electromagnetic
ESA	Environmental Site Assessment
FOC	Fractional Organic Carbon
ft	Foot or Feet
GDCSS	Generic Direct Contact Soil Standard
GPR	Ground-Penetrating Radar
GPS	Global Positioning System
GRO	Gasoline Range Organics
IDW	Investigation Derived Waste
LBSV	Leach-based Soil Value
Mg/kg	Milligram per kilogram
NAPL	Non-Aqueous Phase Liquid
OAC	Ohio Administrative Code
OEPA	Ohio Environmental Protection Agency
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
pH	Hydrogen Ion Concentration
Phase I	Phase I Environmental Site Assessment
PID	Photoionization Detector

ACRONYM LIST (continued)

PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RECs	Recognized Environmental Conditions
SAP	Sampling and Analysis Plan
SVOC	Semivolatile Organic Compound
SWL	Static Water Level
TBA	Targeted Brownfields Assessment
TAL	Target Analyte List
TCLP	Toxicity Characteristic Leachate Procedure
TOC	Top of Casing
TPH	Total Petroleum Hydrocarbon
UPUS	Unrestricted Potable Use Standard
USCS	Unified Soil Classification System
USDA	United States Department of Agriculture
USGS	United States Geological Survey
UST	Underground Storage Tank
VAP	Ohio Voluntary Action Program
VOC	Volatile Organic Compound
WESTON	Weston Solutions, Inc.

1.0 Introduction

Weston Solutions, Inc. (WESTON®) has prepared this report to document a Phase II Environmental Site Assessment (ESA) conducted for the Former Fulton Automobile (Auto) Wrecking property (Site), located at 2300 Fulton Road in Cleveland, Cuyahoga County, Ohio (**Figure 1**). The Phase II ESA was conducted at the request and authorization of the U.S. Environmental Protection Agency for Cuyahoga County, Ohio through the Targeted Brownfield Assessment (TBA) grant program.

The Phase II ESA was conducted in accordance with Ohio Administrative Code (OAC) 3745-300-07, the *Sampling and Analysis Plan (SAP)*, dated October 10, 2013, *Quality Assurance Project Plan (QAPP)*, dated October 2009, and Site-Specific *QAPP Addendum*, dated October 28, 2013 with any deviations noted herein. The purpose of the Phase II ESA was to investigate the Site for the presence of hazardous substances and petroleum products in environmental media. The Phase II ESA was conducted to assess Recognized Environmental Conditions (RECs) identified through a Phase I Environmental Site Assessment (Phase I), prepared by AOCC Group, Inc. (AOCC) (November 28, 2012). The future anticipated Site use is residential or mixed use.

The Phase II ESA was completed by the following WESTON personnel:

- Katie Mooney, TBA Program Manager
- Laura Funk, Certified Professional (CP) and Project Manager
- Tonya Balla, Quality Assurance (QA) Reviewer
- Lisa Graczyk, QA Reviewer
- Ryan Green, Field Geoscientist
- Dustin Bates, Field Geoscientist
- Andrew Kiel, Field Geoscientist
- Natalie Wojdakowski, Geographic Information Systems

The geophysical survey was completed by Geosearches, Inc. Rotasonic drilling and well installation was completed by Frontz Drilling, Inc. Analytical services were provided by Pace Analytical Services, Inc. Indianapolis (Ohio Voluntary Action Program [VAP] Certified Laboratory #CL0065) and Pace Analytical Services, Inc. New Orleans.

1.1 Site Background

The Site is located at 2300 Fulton Road, Cleveland, Cuyahoga County, Ohio. The Site occupies approximately 2 acres and is composed of two parcels identified as 007-07-044 and 007-07-037. Cuyahoga County online property records indicate that Parcel 007-07-044 was forfeited by DeSoto Properties, LLC to the State of Ohio on July 19, 2013 (Case #CV 543720), and Parcel 007-07-037 is owned by DeSoto Properties, LLC. The Site is bordered to the west by residences, to the north by residences and a cemetery, to the south by a railroad, and to the east by industrial properties.

Historic records indicate that a filling station occupied the Site from the 1930s to the 1950s or later and that the Site has been used for automobile salvaging since the 1950s or earlier. The Site was vacant but evidence of usage as an automobile junk yard was observed during the Phase I ESA reconnaissance in 2012.

1.2 Phase II ESA Objectives

The objectives of the Phase II ESA included:

- Determining if underground storage tanks (USTs) are present in the area of the former filling station (i.e. location of gasoline tanks as indicated on the 1951 Sanborn map) and in the area of the unidentified vertical pipe that was observed during the Phase I ESA reconnaissance.
- Identifying the presence and concentrations of chemicals of concern (COCs) in Site soil and groundwater, including:
 - Characterizing surface and subsurface soil COCs as compared to Ohio VAP generic direct contact soil standards (GDCSS) for residential site use, Ohio VAP GDCSS for commercial/industrial site use, Ohio VAP GDCSS for protection of construction workers, generic leach-based soil values (LBSVs), and Ohio Bureau of Underground Storage Tank Regulations (BUSTR) action levels, as applicable.
 - Characterizing groundwater COCs as compared to Ohio VAP unrestricted potable use standards (UPUS) and Ohio BUSTR action levels, as applicable.
- Determining property setting information, including stratigraphy and hydrogeology, for use in preparing a conceptual Site model and potentiometric surface mapping.
- Characterizing investigation-derived waste (IDW) (both soil and water) generated during the investigation for waste profiling and disposal.

Investigation for asbestos-containing materials was not included in the Phase II ESA scope of work.

2.0 Investigative Methodology

The Phase II ESA field investigation included soil sampling and groundwater sampling. Samples of IDW were also collected for waste characterization purposes. Sampling activities were conducted in October and November 2013. The Phase II ESA investigative methodology is described in the following sections. The Phase II ESA investigative locations are presented on **Figure 2**.

2.1 Geophysical Survey

An electromagnetic (EM) Terrain Conductivity survey was completed in the area of the gasoline USTs identified on the 1951 Sanborn map and in the area south of the former building, as shown on **Figure 2**. The EM survey was followed by a targeted Ground-Penetrating Radar (GPR) survey, as feasible, to further evaluate any significant anomalies identified by the EM survey.

The geophysical survey did not identify any metallic objects that could be indicative of a UST in the area of the former filling station. The geophysical survey identified a cylindrical object, which could be indicative of a UST or conductive utility line, in the area south of the former building. The response indicated the object was present at approximately 3 feet below ground surface (bgs). The cylindrical object response was observed in close proximity to a pipe protruding from the ground. The geophysical survey report is provided in **Appendix A**.

2.2 Soil Sampling

Soil samples were collected using sonic drilling techniques from 15 sampling locations. The soil sampling locations were identified in the approved *SAP* and are shown on **Figure 2**. Soil was continuously collected within sonic core barrels and extracted into disposable plastic liners. The lithology for each soil core was logged using the Unified Soil Classification System (USCS) and recorded on a boring log (**Appendix B**). Each core was screened for volatile organic compounds (VOCs) utilizing a photoionization detector (PID). PID screening was conducted by inserting the probe of the PID into cracks made in the soil core using a decontaminated steel scoop. PID screening results were recorded for each two foot (ft) interval on the boring logs.

The sampling procedures are documented in **Sections 2.2.1** and **2.2.2**. All samples were uniquely identified and labeled and stored on ice pending submittal to the laboratory. Soil samples were submitted for one or more of the following analyses: VOCs, semivolatile organic compounds (SVOCs), target analyte list (TAL) metals, total petroleum hydrocarbons (TPH) gasoline range organics (GRO), TPH diesel range organics (DRO), polychlorinated biphenyls (PCBs), hydrogen ion concentration (pH), and fractional organic carbon (FOC). The results of the analyses are described in **Section 5.1**.

2.2.1 Soil Sampling for SB01, SB02, and MW01

Soil borings in the historic UST area were advanced to the upper-most saturated zone. Soil samples were collected and containerized for every 2-ft interval of the vadose zone. The soil

samples were collected in the following requisite order:

- Soil was collected directly from the soil core into Terra Core samplers, or equivalent, and extruded into the laboratory supplied vials for possible VOC and TPH-GRO analysis. No significant PID readings were observed. The Terra Core sampler was plunged into the core at three locations within the two ft interval to collect the sample. This practice was repeated for each vial filled.
- Soil was collected into a small sealed bag, filled no more than half full, for PID reading of the headspace following equilibration. Soil placed into the bag was representative of the two ft interval.
- With the exception of the 8 to 10 ft intervals (described as a deviation below), the remaining soil for each 2-ft interval identified for analysis was homogenized. The homogenizing procedure is designed to increase the probability that a relatively small sample aliquot is representative of a relatively large soil volume removed from a sample location, thereby enhancing the representativeness and reproducibility of the sample. The homogenizing process included placing the sample material in a decontaminated bowl and using a steel scoop to break up the material into pieces approximately ½ inch or less in diameter and mix the material. The homogenizing process was considered complete when the texture and color of the sample appear uniform throughout. The homogenized soil for remaining analyses was transferred into the appropriate sample jars. Any sizable stones, brick, asphalt, concrete, and vegetation/ root material were excluded from the samples.
- The sample containers were labeled and stored on ice pending selection of samples for analysis.

PID headspace readings were collected after a minimum elapse of 10 minutes and equilibration of the soil in the bags to room temperature (i.e. approximately 70 degrees Fahrenheit). PID headspace readings were determined by punching the probe of the PID through the plastic and into the headspace of the bag. The maximum PID reading for each bag was recorded as the PID headspace for that 2-ft interval.

The homogenization process implemented for the 8 to 10 ft interval of SB01, SB02, and MW01 did not comply with the *SAP*-specified procedure. This deviation was identified during the field investigation and corrected for borings conducted thereafter, as further described in **Section 2.2.2**. The SVOC, TPH-DRO, PCB, and metal soil samples for the 8 to 10 ft intervals of SB01, SB02, and MW01 were collected from the representative soil used for headspace analysis. This collection technique is not anticipated to have impacted the PCB and metals data, but there is a potential for low bias to the SVOC and TPH-DRO results for the 8 to 10 ft interval of SB01, SB02, and MW01 as a result of this collection technique.

Samples from SB01, SB02, and MW01 were selected for analysis per the following selection criteria:

- The interval from 0 to 2 ft bgs at each boring was selected for analysis;
- The interval from 2 to 4 ft bgs at each boring was selected for analysis;
- The 2-ft interval immediately above the soil/groundwater interface at each boring was selected for analysis;
- Per the *SAP*, the 2-ft vadose zone interval exhibiting the highest PID headspace reading at each boring was selected for analysis, or if already represented by one of the samples identified above, then the 2-ft vadose zone interval with the second highest PID headspace reading was to be selected for analysis, or in the absence of headspace indications of contamination, the 8 to 10 ft interval was to be selected for analysis. Because there were no headspace indications of contamination, the intervals from 8 to 10 ft bgs at MW01, SB01, and SB02 were selected for analysis, which is consistent with the *SAP*.

Soil samples that were containerized but were not selected for analysis were incorporated into the on-Site IDW container with the exception of the sample jars preserved with methanol, which were sent to the laboratory for disposal.

2.2.2 Soil Sampling for SB03 through SB12, MW02, and MW03

Excluding MW02, MW03, and the borings identified in **Section 2.2.1**, all other soil borings were advanced to 10 ft bgs. MW02 and MW03 were advanced into the water table, but soil samples were selected for analysis from 0 to 10 ft bgs only consistent with this section and the *SAP*.

Soil samples were collected immediately following extraction of the soil from the boring and completion of the initial PID field screening. The Terra Core and headspace sampling procedures implemented for soil collected from MW02 and MW03 was consistent with the collection technique described in **Section 2.2.1**. For all other borings (i.e. SB03 through SB12) and the off-set location drilled to collect the 2 to 4 ft interval of MW02 (identified with the suffix “b”), the aliquots collected for VOC and TPH-GRO analysis and headspace readings were collected directly from the soil core at the location of the highest PID field screening results for the 2-ft interval.

The criteria for selection of soil samples for analysis was as follows:

- The interval from 0 to 2 ft bgs was sampled at each boring;
- The interval from 2 to 4 ft bgs was sampled at each boring;
- A 2-ft interval was selected from between 4 and 10 ft bgs and sampled at each boring. The 2-ft interval selected for sampling was biased to the interval with the most significant visual and olfactory observations of contamination and/or highest PID field screening readings. If there were no obvious signs of contamination, the 8 to 10 ft bgs interval was sampled.

Soil samples were collected from the select 2-ft intervals immediately following completion of the initial PID field screening. If there were no visual or olfactory indications of contamination and the initial PID field screening did not indicate a volatile organic presence (i.e. PID field screening is consistent with background ambient air), then the VOC, TPH-GRO, and headspace samples were eliminated from the analyses required for that select 2-ft interval. As an exception, VOC, TPH-GRO, and headspace samples were retained as analyses for SB03 and SB12, regardless of PID field screening results and visual/olfactory observations for the purpose of providing additional delineation beyond the former and potential UST areas.

For each 2-ft interval selected for analysis per the criteria above, soil samples were collected in the following requisite order:

- Soil was collected directly from the soil core into Terra Core samplers, or equivalent, and extruded into the laboratory supplied vials for VOC and TPH-GRO analyses (as applicable).
- Soil was collected into small sealed bags, filled no more than half full, for PID reading of the headspace following equilibration (as applicable). The methodology for taking headspace readings was presented in **Section 2.2.1**.
- With the exception of the 8 to 10 ft interval of MW02 and 4 to 6 ft interval of MW03 (described as a deviation below), the remaining soil for each 2-ft interval identified for analysis was homogenized as described in **Section 2.2.1**.

The homogenization process implemented for the 8 to 10 ft interval of MW02 and 4 to 6 ft interval of MW03 did not comply with the *SAP*-specified procedure. The SVOC, TPH-DRO, PCB, and metal soil samples for these two intervals were collected from the representative soil used for headspace analysis. This collection technique is not anticipated to have impacted the PCB and metals data, but there is a potential for low bias to the SVOC and TPH-DRO results for the 8 to 10 ft interval of MW02 and 4 to 6 ft interval of MW03 as a result of this collection technique.

Soil samples that were containerized but were not selected for analysis were incorporated into the on-Site IDW container with the exception of the samples with containers preserved with methanol, which were disposed of by the laboratory.

2.3 Groundwater Sampling

Monitoring wells sampled as part of the Phase II ESA included three monitoring wells screened in the upper saturated zone. The monitoring well locations are shown on **Figure 2**. Groundwater samples were submitted for laboratory analysis of COCs including VOCs, SVOCs, and TAL metals. The results of the analyses are described in **Section 5.2**.

2.3.1 Monitoring Well Installation

The monitoring wells (MW01, MW02, and MW03) were installed in October 2013. The

monitoring wells are constructed of 2-inch diameter, 10-ft (schedule 40), 0.010 slot, polyvinyl chloride (PVC) screen, and PVC riser. The well screens are 10 ft in length and positioned to straddle the water table. MW01 is screened at 24 to 34 ft bgs and MW02 and MW03 are screened at 21 to 31 ft bgs.

A filter sand-pack consisting of silica sand was installed from the bottom of the screen to between 1 and 2 ft above the top of the screen. A 2-ft thick bentonite seal, consisting of bentonite pellets, was installed above the filter sand pack and the remainder of the annular space was sealed with a bentonite-cement grout introduced via tremie pipe. The wells were completed with steel protective casings (stick-up casings). The protective casings were installed over the wells and each well was secured with an expandable plug and lock. The wells were finished with a 2-ft by 2-ft concrete pad, appropriately sloped to divert run off.

2.3.2 Monitoring Well Development

Monitoring wells installed during the Phase II ESA were developed on October 31, 2013 after a minimum of 24 hours had elapsed post-well construction. Well development activities were conducted by Frontz Drilling, Inc. in accordance with the *Technical Guidance Manual for Hydrogeologic Investigations and Ground Water Monitoring* (Ohio Environmental Protection Agency [OEPA], 2009). Each well was developed through purging techniques with three to five well volumes removed. Conductivity, pH, temperature, and turbidity were measured periodically during development. Well development logs were used to record conditions before, during, and post development (**Appendix B**).

2.3.3 Water Level Measurements

Static water level (SWL) measurements were collected using an oil-water interface probe on October 31, 2013 and November 4, 2013 (excluding MW03 due to probe error). Monitoring wells were opened and allowed to equilibrate with atmospheric pressure before measurement. All SWLs were collected within a 12 hour period to minimize the potential for atmospheric pressure change or impacts from precipitation events. Non-aqueous phase liquid (NAPL) was not identified by the oil-water interface probe in any of the monitoring wells. All depths to water measurements were recorded relative to the top of casing (TOC). The depths to water measurements were later correlated using survey data to determine the groundwater elevation above mean sea level (amsl). The groundwater elevation data is presented in **Table 1**.

2.3.4 Surveying

Monitoring wells were surveyed by a licensed surveyor (Dempsey Surveying Group) to establish TOC elevations and location with respect to northing and easting State Plane coordinates. Monitoring wells were surveyed for vertical datum relative to an established United States Geological Survey (USGS) benchmark. Survey elevations were collected for each TOC. A Global Positioning System (GPS) capable of sub-meter accuracy was used for northing and easting coordinate determination. Land-based survey methods were used to link newly installed monitoring wells with existing USGS datum. A GPS unit was also used to collect coordinates

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for the soil borings locations. Survey data is provided in **Appendix C**.

2.3.5 Groundwater Sampling

The EPA recommended low-flow sampling technique was utilized for the collection of groundwater samples from the Site monitoring wells. Low-flow sampling is designed to minimize aquifer disturbance, contaminant volatilization, and wastewater generation.

The methodology used for low-flow sampling was as follows: measure the SWL in the well to the nearest 0.01-ft, lower a bladder pump (submersible pump with dedicated tubing) so that the intake is within the screened interval, purge the monitoring well using the adjustable rate pump, monitor the water level, and adjust the pumping rate so that drawdown is no greater than 0.3 ft. The pump and tubing were lowered so that they did not contact and disturb any sediment that may have been present at the bottom of the well. Purging began at the lowest possible flow rate so that any sediment present in the well was not disturbed. During purging, groundwater was monitored for pH, temperature, conductivity, turbidity, dissolved oxygen and oxidation-reduction potential until the parameters were stabilized. All field conditions and sampling information were recorded on sampling logs (**Appendix B**). Once the parameters stabilized, groundwater samples were collected directly from the pump/tubing discharge into the sample containers provided by the laboratory. Due to malfunction of the oil-water interface probe, water level monitoring during purging of MW03 was not conducted.

2.4 IDW Sampling

The drums of solid IDW were divided into three conceptual waste streams based upon location of origin and field observations. A composite sample of the drum contents representing each waste stream was collected and analyzed for full-suite Toxicity Characteristic Leachate Procedure (TCLP) characterization and flashpoint. The results of the analyses are described in **Section 5.5**.

Development water, purge water, and decontamination water were containerized in drums. Decontamination water was containerized separate from the groundwater with the exception of water associated with decontamination of the bladder pump, which was included in the development and purge water drums. A representative sample of the decontamination water was collected and analyzed for VOCs, SVOCs, PCBs, and Resource Conservation and Recovery Act (RCRA) metals. A representative sample of the well development and purge water was collected and analyzed for PCBs. The pH of the decontamination water, as measured in the field, ranged from 8.2 to 9.1.

2.5 Sample Handling, Tracking, and Custody Procedures

2.5.1 Sample Labeling

All samples for analysis, including QC samples, were given a unique sample number per the following format in accordance with the approved *SAP*:

FAW-matrixXX(Y-Z)-mmddyy

Where:

- “FAW” designates the sample is from the Fulton Auto Wrecking property
- “matrix” indicates the sample matrix, i.e. “SB” for soil boring, “MW” for monitoring well, and “IDW” for investigation-derived waste.
- “XX” is the location number for soil borings and monitoring wells and the sequential number for IDW samples. The sample locations are marked on the figures presented in this Phase II ESA report for reference.
- (Y-Z) is the sample depth interval, for soil samples only.
- mmddyy is the date.

An offset to sampling location MW02 was drilled on October 30, 2013 in order to collect a sample from 6 to 8 ft which was inadvertently omitted during drilling of MW02 on October 29, 2013. A second offset to MW02 was drilled on November 1, 2013 and designated MW02b, in order to collect a duplicate VOC sample from 2 to 4 ft bgs using the collection methodology identified in **Section 2.2.2**. The offset drilling locations were 5 to 10 ft away from the original MW02 drilling location (i.e. the MW02 monitoring well location).

Field duplicate samples were designated with a “D” suffix. Equipment blank samples were designated with a “EB” suffix. Trip blank samples were designated with a “TB” suffix. One trip blank submitted on October 28, 2013 deviated from this nomenclature and was labeled “Trip Blank.”

2.5.2 Sample Packaging and Shipping Procedures

All samples were identified, handled, shipped, tracked, and maintained under chain of custody in accordance with the *QAPP*.

All samples were collected in appropriate, laboratory-supplied sample containers, pre-preserved by the laboratory as applicable. Sample containers were tightly sealed and immediately packed on ice in coolers in an upright position. Upon collection of all samples, the appropriate laboratory chain-of-custody forms were completed. Sample coolers were securely taped prior to delivery to prevent any tampering or loss of samples. Samples were shipped via laboratory courier with relinquish and acceptance dates and times recorded on the chain of custody forms.

Sample custody and chain-of-custody protocols as described in the EPA Region V Policy “NEIC Policies and Procedures,” EPA-330/9-78-001-R, revised June 1985 were followed. The chain-of-custody allows for the tracing of possession and handling of individual samples from the time of field collection through the analytical laboratory analyses.

2.5.3 Quality Assurance/Quality Control Procedures

Field QA/QC samples were obtained and submitted for analysis during the course of the field investigation activities for use in assessing the quality of the data resulting from the field sampling program, including:

- Trip Blanks: These samples are applicable to VOC analyses, and therefore accompanied each of the groundwater and soil sample shipments (one trip blank per cooler). They were prepared by the laboratory from deionized (DI) water, and accompanied the project samples through all custody changes to provide information regarding possible contamination obtained during the sample handling process and, thereby, provide a measure of analytical accuracy.
- Duplicates: These samples are duplicate samples collected in the field and submitted to the laboratory without indication of the corresponding sample. These samples were collected at a rate of 1 per every 20 samples and provide a measure of laboratory precision and matrix variability.
- Field Rinsate Blanks: These samples were collected to evaluate the effectiveness of the field decontamination of reusable sampling equipment. Field rinsate blanks were prepared by pouring DI water over the sampling equipment after a decontamination procedure was completed. This rinse water was then collected and submitted for analysis to provide an indication of the effectiveness of decontamination procedures (carry-over from sample to sample). Two field rinsate blanks were collected and analyzed.
- Matrix Spike Samples: Additional aliquots of investigative samples were provided to the laboratory at a rate of 1 per every 20 samples for matrix spike/matrix spike duplicate analysis. These analyses provide indication of potential matrix interference with the analytical results.

The QA/QC sample results were evaluated as part of the data validation process. Data validation reports are provided in **Appendix D**. Validation qualifiers were applied to the data in the report tables.

2.6 Field Measurements and Recordkeeping

The field team and project manager monitored adherence to the *SAP*, *QAPP*, and *QAPP Addendum*. A field logbook and task-specific forms (e.g., groundwater purging forms and soil boring logs) were maintained to document the sampling activities. Field screening and monitoring equipment was calibrated daily as recorded in the logbook.

At the beginning of each logbook entry, the date, start time, and weather conditions were recorded. Measurements made and samples collected were recorded in the field logbook or on field forms. Entries were made in ink with no erasures. If an incorrect entry was made, the information was crossed out with a single strike mark, initialed, and dated. At the end of each logbook entry, the signature of the person making the entry was entered.

Evidentiary files for the entire project have been maintained and consist of the following:

- *SAP*
- *QAPP* and *QAPP Addendum*
- Project logbook
- Field data records
- Chain-of-custody records
- Correspondence
- Final data packages
- Miscellaneous documents (photographs, maps, drawings, etc.)
- Reports

2.7 Decontamination procedures

All reusable sampling and downhole equipment coming into contact with potentially contaminated media was decontaminated prior to each use, between each sampling location, and at the completion of the field investigation. Decontamination methods for sampling equipment consisted of an Alconox detergent wash followed by a potable water rinse. Drilling equipment was decontaminated using a steam pressure washer over a tub. All water generated during decontamination activities was collected, containerized, and staged on Site pending transportation and disposal.

2.8 Waste Characterization and Management

During all field activities, IDW, including soil cuttings, well development and purge water and decontamination water, was collected and containerized. Solid IDW and liquid IDW were containerized separately. IDW was containerized in Department of Transportation approved 55 gallon drums and staged together on the Site at a flat, truck-accessible location (i.e. inside the Bailey Court gate). The drums were securely closed during storage. The drums were labeled with the following information pending receipt of waste characterization results:

- This container on hold pending analysis
- Contents: Investigation-derived waste, solid (soil cuttings), or liquid (well purge water, decontamination water) [indicated as applicable])
- Origin of Materials: SBXX or MWXX (multiple investigative locations were indicated, as applicable)
- Date (of first use)
- Site address

The drums of IDW were transported off-Site for disposal. Disposable sampling equipment and

personal protective equipment such as gloves were disposed in a sanitary waste dumpster as general refuse.

2.9 Analytical Methodology

Pace Analytical, a VAP-certified laboratory, performed the analyses using the methodologies presented below. VAP-certified methodologies were not required for TCLP, flashpoint, pH, and FOC.

Soil investigative samples were analyzed using one or more of the following analytical methods:

- VOCs – EPA Method 8260B. Soil samples were collected using Terra Core samplers and processed per Method 5035A
- TPH-GRO – EPA Method 8015B. Soil samples were collected using Terra Core samplers and processed per Method 5035A
- SVOCs – EPA Method 8270C
- TPH-DRO - EPA Method 8015M
- TAL metals – EPA Method 6000/7000 Series
- PCBs – EPA Method 8082
- pH - EPA Method 150.1 or 9045
- Total organic carbon – Method Walkley-Black

The soil IDW samples were analyzed using the following analytical methods:

- TCLP – EPA Method 1311 and 7470A, SW6010B, SW8270C, SW8260, 8081, and 8151
- Flashpoint – EPA Method 1010

Groundwater samples were analyzed using the following analytical methods:

- VOCs – EPA Method 8260
- SVOCs - EPA Method 8270
- TAL metals – EPA Method 6000/7000 Series

The decontamination water IDW sample was analyzed using the following analytical methods:

- VOCs – EPA Method 8260
- SVOCs - EPA Method 8270

- RCRA metals – EPA Method 6000/7000 Series

A composite sample of the well development and purge water was analyzed for PCBs by EPA Method 8082.

The list of TAL metals included aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, selenium, silver, thallium, vanadium, and zinc.

3.0 Environmental Setting

3.1 Regional Physiography

The Cuyahoga County online geographic information system indicates that the ground surface elevation of the Site ranges from approximately 670 to 690 ft amsl with a steep downward slope along the southern boundary and a gradual slope near the eastern boundary. The Soil Conservation Service classification of soil in the area of the Site is Urban Land.

3.2 Regional Geology and Hydrogeology

According to the Phase I ESA (AOCC, 2012), the underlying geological materials are classified as Upper Devonian age, Stratified Sequence. The Soil Survey of Cuyahoga County, Ohio (United States Department of Agriculture [USDA] 1980) identifies the soil type for the Site as Elnora-Urban land complex. This soil is described as being 70 percent urban land and 30 percent Elnora loamy fine sand. Permeability is moderately rapid to rapid and runoff is low in this soil.

The Cuyahoga County Groundwater Resources map indicates the Site is located in an area of impermeable deposits (clay overlaying shale or shaley sandstone) likely to yield less than 3 gallons per minute. Well logs in the vicinity of the Site available through the Ohio Department of Natural Resources website indicate well depths in the range of 15 to 36 ft.

3.3 Site Geology and Hydrogeology

Brick, limestone, and concrete fragments were observed on the ground surface over much of the Site. The Site geology observed during the Phase II ESA was primarily sand, clayey sand, and sandy gravels. Occasional fragments of brick, rock, wood, and other debris were observed at depths up to 13 ft bgs. Low permeability lenses (stiff silty clay or clayey silt) usually one foot or less in thickness were observed in several borings at depths ranging from 6 to 18 ft bgs. Staining and/or odor was observed in four borings: MW01 (27.5 to 28.5 ft bgs), SB05 (7 ft bgs), SB08 (7 to 10 ft bgs), and SB10 (4 to 7 ft bgs). **Figure 3** presents Site-specific stratigraphic cross section information. Soil boring and monitoring well installation logs are included in **Appendix B**.

Saturation was generally encountered at 23 to 26 ft bgs within sand and sandy gravel. The Geocheck® Physical Setting section of the Environmental Data Resources, Inc. (EDR) report included with the Phase I ESA indicated that groundwater flow was likely in a northeast direction, but SWL measurements from Site monitoring wells indicate flow direction at the Site to be in an east-southeast direction. A potentiometric surface map based upon SWL measurements collected on October 31, 2013 is presented as **Figure 4**.

3.4 Groundwater Classification

Groundwater classification is required under OAC 3745-300-10 for each groundwater zone containing COCs in excess of UPUS in order to determine the appropriate response requirements. Groundwater classification is determined based upon a number of factors including use for public water supply, the sustainable yield of the zone, the total dissolved content, and type and depth of the unit formation.

As described in **Section 5.2.**, COCs were not identified in groundwater at concentrations exceeding UPUS, therefore, classification of the groundwater is not required for this Site.

4.0 Determination of Applicable Standards

To achieve VAP compliance, each exposure pathway that is complete or reasonably anticipated to be complete must meet applicable standards for that pathway and cumulative risk must not exceed the established risk goals. The following sections include an evaluation of the exposure pathways, receptor populations, and applicable standards identified for the Site.

4.1 Exposure Pathways and Receptors

The following exposure pathways are complete or reasonably anticipated to be complete based upon an assumed future residential or mixed use of the Site:

- Potable and/or non-potable use of groundwater,
- Leaching of COCs from soil to groundwater,
- Particulates or vapor emissions from soil to outside air,
- Direct contact with soil by residential receptors, commercial/industrial receptors, and construction workers, and
- Vapor intrusion to indoor air (if a building were constructed in the future).

In addition, the following pathways to off-site receptors also warrant consideration:

- Potable and non-potable use of groundwater,
- Vapor intrusion to indoor air,
- Particulates or vapor emissions from soil to outside air,
- Protection of surface water quality from groundwater discharges, and
- Protection of important ecological resources, if applicable.

Reasonably anticipated current and future receptors include:

- Adults and children occupying residential units on the Site;
- Adult commercial or industrial workers employed at the future businesses on the Site;
- Construction workers responsible for development of the Site and ongoing maintenance;
- Visitors and patrons to the future establishments on the Site or to residential units on the Site;

Potential off-site receptors which may include:

- Workers, occupants, visitor, and recreational users of adjacent properties;

- Important ecological resources.

This list of exposure pathways and receptor populations may be refined through a Property-Specific Risk Assessment or further evaluation.

4.2 Applicable Standards

Based upon the identified exposure pathways and potential receptor populations, the applicable standards used to determine VAP compliance for Site environmental media are:

- GDCSS for residential land use within 0 to 10 ft soil point of compliance (dermal contact with soil, inhalation of vapors and particles from soil, and ingestion of soil at a high frequency).
- GDCSS for commercial/industrial land use within 0 to 2 ft soil point of compliance (dermal contact with soil, inhalation of vapors and particles from soil, and ingestion of soil during the business day).
- GDCSS for construction worker protection within a 0 to 10 ft soil point of compliance.
- Leach-based soil standards for protecting groundwater for potable use (vadose zone).
- UPUS for groundwater on, and emanating from, the Site.

Generic vapor intrusion screening levels for bulk soil are not available in the Ohio VAP rules. Johnson and Ettinger modeling may be conducted to determine if volatile compounds detected in soil could present a risk of vapor intrusion to indoor air. If potential vapor intrusion risk is identified, further evaluation through collection of soil gas samples or remediation such as mitigation of the risk is necessary to proceed with the voluntary action. Johnson and Ettinger modeling is beyond the scope of the Phase II ESA and would typically be conducted as part of a Property-Specific Risk Assessment, if necessary.

Per the OAC 3745-300-09, a risk assessment must be performed to determine applicable standards for COCs that were detected for which standards are not provided in OAC 3745-300-08, to derive Site-specific standards, or for assessment of non-default pathways. Completion of a VAP-compliant Property-Specific Risk Assessment was beyond the scope of the Phase II ESA.

4.3 Multiple Chemical Adjustment

The Ohio VAP requires that an evaluation of cumulative risk levels be conducted if more than one non-carcinogenic or carcinogenic chemical is present within each area of concern (AOC) or Exposure Unit. In order for the Site to meet the applicable VAP standards, the sum of the ratios of each chemical against its respective site standard must not exceed 1, calculated at one significant figure. If the cumulative non-cancer or cumulative cancer risk ratio exceeds 1, then a multiple chemical standard must be derived for each COC.

For direct contact with soils, the carcinogenic hazard index estimate was determined using the following equation:

$$\text{Cumulative cancer risk ratio for direct contact} = \left[\frac{\text{chem}_a}{\text{GDCSC}_a} + \frac{\text{chem}_b}{\text{GDCSC}_b} + \dots \right]$$

Where:

- GDCSC is the generic direct contact soil standard for a single carcinogen
- chem_x is the chemical-specific exposure point concentration for direct contact soils (representative concentration for the AOC).

The noncarcinogenic hazard index estimate was determined using the following equation as presented in the table below:

$$\text{Cumulative noncancer risk ratio for direct contact} = \left[\frac{\text{chem}_a}{\text{GDCSN}_a} + \frac{\text{chem}_b}{\text{GDCSN}_b} + \dots \right]$$

Where:

- GDCSN is the generic direct contact soil standard for a single noncarcinogen
- chem_x is the chemical-specific exposure point concentration for direct contact soils (representative concentration for the AOC).

The multiple chemical adjustment evaluation for this Site is presented in **Section 5.1.1**.

4.4 COCs in Background Soil

Due to a long history of industrial activities in urban areas, the background levels of various COCs are often higher than those encountered in pristine locations having little anthropogenic influence. Soils in urban settings often contain elevated levels of metals related to fallout associated with the burning of fossil fuels and refuse for the generation of heat and power, or from other industrial sources. Therefore, it is useful to determine background levels of applicable COCs when assessing a Site. A suitable area for background soil sampling is not present on Site.

OAC Rule 3745-300-07 (H)(2) specifies how the volunteer may determine background levels using off-property investigations when it is not possible to find sampling locations that are unaffected by Site activities. These investigations may use data that are demonstrated to be reliable and representative of background levels for the property and may include peer-reviewed information, research reports generated or sponsored by local, state, or federal agencies, or college or university research reports including theses and dissertations. OEPA has compiled a

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background metals data set for Cuyahoga County soil and determined background upper limits as described in the *Evaluation of Background Metal Soil Concentrations in Cuyahoga County–Cleveland Area, Summary Report*, March 2013. The following background upper limits are identified in the cited report:

- Arsenic – 24.0 milligrams per kilogram (mg/kg)
- Barium – 98.9 mg/kg
- Cadmium – 0.834 mg/kg
- Chromium – 21.1 mg/kg
- Lead – 51.7 mg/kg
- Mercury – 0.097 mg/kg
- Selenium – 0.943 mg/kg

5.0 Phase II ESA Results

The results of the Phase II ESA are described in this section. The results have been compared to the applicable standards identified in **Section 4.2**. The laboratory affidavits and data packages are provided in **Appendix E**.

5.1 Soil

Soil samples were analyzed for one or more of the following analyses per the selection criteria described in **Section 2.2**: VOCs, SVOCs, TAL metals, TPH-GRO, TPH-DRO, and PCBs. One sample per boring was selected for FOC and pH analyses. The results are presented in **Table 2**.

The Ohio VAP direct contact point of compliance for residential (unrestricted) use is to a minimum of 10 ft bgs. Several polycyclic aromatic hydrocarbons (PAHs) are present in surface and subsurface soil at concentrations exceeding residential GDCSS. Butylbenzylphthalate was detected in surface soil of SB10 at a concentration exceeding the residential GDCSS. Arsenic was detected at concentrations exceeding residential GDCSS in numerous soil samples, but most concentrations were near the background upper limit with the exception of elevated arsenic concentrations reported in SB05 (0 to 2 ft, 2 to 4 ft). Lead was detected in several samples at concentrations exceeding residential GDCSS which is also above the background lead concentrations. Antimony was detected in subsurface soil of SB08 (8 to 10 ft) at a concentration exceeding the residential GDCSS. PCBs (Aroclor-1260) were detected in subsurface soil of SB08 (8 to 10 ft) at a concentration exceeding the residential GDCSS. **Figure 5** shows soil results within 0 to 10 ft bgs that exceed the VAP residential GDCSS.

A shallower point of compliance may be applied if the residential use is restricted through appropriate controls so as to prevent direct contact exposure to soil at depths below the applied point of compliance (e.g. limitation to excavation depths and slab-on-grade construction). A technical guidance document that discusses use of a restricted residential point of compliance is provided in **Appendix F**. As described in the guidance document, application of a restricted point of compliance can be beneficial for properties for which remediation of the 0 to 10 ft zone is not economically or technically feasible. **Figure 6** shows soil results within 0 to 4 ft bgs that exceed the VAP residential GDCSS.

The Ohio VAP direct contact point of compliance for commercial/industrial use is to a minimum of 2 ft bgs. To accommodate decision making for grade changes that may be needed to prepare the Site for development, soil results within 0 to 4 ft bgs have been compared to commercial/industrial GDCSS. Several PAHs are present in surface and subsurface soil at concentrations exceeding commercial/industrial GDCSS. Butylbenzylphthalate was detected in surface soil of SB10 at a concentration exceeding commercial/industrial GDCSS. Lead was detected in the surface soil sample collected at SB04, at a concentration exceeding the commercial/industrial GDCSS. Arsenic was detected in samples from surface and 2 to 4 ft bgs at SB05 at concentrations exceeding commercial/industrial GDCSS. **Figure 7** shows soil results within 0 to 4 ft bgs that exceed the VAP commercial/industrial GDCSS.

The Ohio VAP direct contact point of compliance for construction workers is to the maximum

anticipated depth of excavation during construction and infrastructure placement or repair, typically to 10 ft bgs. Several PAHs were detected in SB11 (2 to 4 ft) at a concentration exceeding the construction worker GDCSS. Butylbenzylphthalate was detected in surface soil of SB10 at a concentration exceeding the construction worker GDCSS. 1,2,4-Trimethylbenzene was detected in MW02 (2 to 4 feet) at a concentration exceeding the construction worker GDCSS. Lead was detected in several samples at concentrations above the construction worker GDCSS. **Figure 8** shows soil results within 0 to 10 ft bgs that exceed the VAP construction worker GDCSS.

TPH was detected in SB08 (8 to 10 ft) and SB11 (2 to 4 ft) at concentrations exceeding the residual saturation levels (i.e. BUSTR action levels). The BUSTR action levels are used by the Ohio VAP as applicable standards for TPH identified within the points of compliance. TPH concentrations exceeding BUSTR action levels are shown on **Figures 5 through 8**, as relevant to the depths indicated.

Several VOCs, SVOCs, and metals were detected at concentrations exceeding generic LBSVs. LBSVs represent the concentrations of hazardous substances or petroleum that may be present in the soils that ensure protection of potable groundwater use. Leaching potential is highly dependent on a number of Site-specific factors including FOC content, soil pH, clay content, hydraulic conductivity, etc. Generic LBSVs are conservative in order to be protective in most geologic conditions typical for Ohio. Site-Specific LBSVs, which are often less conservative, can be developed as part of a Property-Specific Risk Assessment.

5.1.1 Multiple Chemical Adjustment Evaluation

As a conservative method of determining if multiple chemical adjustment of the GDCSS may be necessary, the maximum concentration of each COC detected anywhere on the Site was used as representative concentrations in cumulative risk level calculations. This is consistent with the Ohio VAP rules which require the representative concentration of each COC within an AOC or Exposure Unit to be determined by either calculating the 95 percent upper confidence limit or by using the maximum concentration of the data set.

Table 3 presents a cumulative risk level calculation for COCs identified from 0 to 2 ft bgs. The cumulative cancer and non-cancer risk ratios for a residential receptor exceed one, indicating that remedial measures or further evaluation are needed and the GDCSS must be adjusted for the presence of multiple chemicals. The cumulative cancer risk ratio for a commercial/industrial receptor exceeds one, indicating that remedial measures or further evaluation are needed and the GDCSS must be adjusted for the presence of multiple chemicals. The cumulative non-cancer risk ratio for a commercial/industrial receptor does not exceed one.

- Chemicals that significantly contribute to the non-cancer risk to a residential receptor in the 0 to 2 ft zone (i.e. risk ratios of 0.25 or greater) include antimony, arsenic, cadmium, chromium, thallium, zinc, and mercury.
- Chemicals that significantly contribute to the cancer risk to a residential receptor in the 0 to 2 ft zone (i.e. risk ratios of 0.25 or greater) include arsenic, benzo(a)anthracene,

benzo(a)pyrene, benzo(b)fluoranthene, butylbenzylphthalate, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene.

- Chemicals that significantly contribute to the cancer risk to a commercial/industrial receptor in the 0 to 2 ft zone (i.e. risk ratios of 0.25 or greater) include arsenic, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene.

Table 4 presents a cumulative risk level calculation for COCs identified from 0 to 4 ft bgs. The cumulative cancer and non-cancer risk ratios for a residential receptor exceed one, indicating that remedial measures or further evaluation are needed if included within the point of compliance and the GDCSS must be adjusted for the presence of multiple chemicals. The cumulative cancer risk ratio for a commercial/industrial receptor exceeds one, indicating that remedial measures or further evaluation are needed if included within the point of compliance and the GDCSS must be adjusted for the presence of multiple chemicals. The cumulative non-cancer risk ratio for a commercial/industrial receptor does not exceed one, based upon one significant figure.

- Chemicals that significantly contribute to the non-cancer risk to a residential receptor in the 0 to 4 ft zone (i.e. risk ratios of 0.25 or greater) include 1,2,4-trimethylbenzene, fluoranthene, naphthalene, pyrene, antimony, arsenic, cadmium, chromium, thallium, zinc, mercury, and PCBs.
- Chemicals that significantly contribute to the cancer risk to a residential receptor in the 0 to 4 ft zone (i.e. risk ratios of 0.25 or greater) include arsenic, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, butylbenzylphthalate, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and naphthalene.
- Chemicals that significantly contribute to the cancer risk to a commercial/industrial receptor in the 0 to 4 ft zone (i.e. risk ratios of 0.25 or greater) include arsenic, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and naphthalene.

Table 5 presents a cumulative risk level calculation for COCs identified from 0 to 10 ft bgs. The cumulative cancer and non-cancer risk ratios for a residential receptor exceed one, indicating that remedial measures or further evaluation are needed and the GDCSS must be adjusted for the presence of multiple chemicals. The cumulative cancer and non-cancer risk ratios for a construction worker exceed one, indicating that remedial measures or further evaluation are needed and the GDCSS must be adjusted for the presence of multiple chemicals.

- Chemicals that significantly contribute to the non-cancer risk to a residential receptor in the 0 to 10 ft zone (i.e. risk ratios of 0.25 or greater) include 1,2,4-trimethylbenzene, fluoranthene, naphthalene, pyrene, antimony, arsenic, cadmium, chromium, thallium, zinc, and mercury.
- Chemicals that significantly contribute to the cancer risk to a residential receptor in the 0 to 10 ft zone (i.e. risk ratios of 0.25 or greater) include arsenic, benzo(a)anthracene,

benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, butylbenzylphthalate, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and naphthalene.

- Chemicals that significantly contribute to the non-cancer risk to a construction worker in the 0 to 10 ft zone (i.e. risk ratios of 0.25 or greater) include 1,2,4-trimethylbenzene, anthracene, naphthalene, antimony, and arsenic.
- Chemicals that significantly contribute to the cancer risk to a construction worker in the 0 to 10 ft zone (i.e. risk ratios of 0.25 or greater) include benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene, and naphthalene.

Because the disease end points for lead include more than just carcinogenic and non-carcinogenic effects, it is not necessary to include lead in the risk ratio calculation. As described in **Section 5.1**, lead was detected in surface and subsurface samples at concentrations exceeding residential, commercial/industrial, and construction worker GDCSS indicating that remedial measures or further evaluation are needed. Likewise, TPH is not included in the risk ratio calculation. TPH was detected in SB08 (8 to 10 ft) and SB11 (2 to 4 ft) at concentrations exceeding the residual saturation levels (i.e. BUSTR action levels). The BUSTR action levels are used by the Ohio VAP as applicable standards for TPH identified within the points of compliance.

GDCSS are not available for all COCs detected in Site soil. Per the OAC 3745-300-09, a risk assessment must be performed to determine applicable standards for COCs that were detected for which standards are not provided in OAC 3745-300-08.

5.2 Groundwater

Groundwater samples were collected and analyzed for VOCs, SVOCs, and metals. The results with concentrations above the laboratory detection limits are summarized in **Table 6**. All samples were compared to Ohio VAP UPUS. No COCs were detected in the groundwater at concentrations exceeding UPUS.

5.3 Leaching Evaluation

Groundwater meets UPUS and thus Protection of Groundwater Meeting UPUS applies to the vadose zone soil. LBSVs represent the concentrations of hazardous substances or petroleum that may be present in the soils that ensure protection of potable groundwater use. As a screening level evaluation, soil sampling results within the vadose zone were compared to generic LBSVs (**Table 2**). LBSVs for organics used for comparison were the generic OEPA LBSVs, Soil Type 1, Dilution Attenuation Factor (DAF) of 1 (2008); and the BUSTR generic petroleum standards for soil to drinking water leaching values (2012). The OEPA LBSVs for inorganics correspond to a DAF of 10.

The following COCs were detected in surface and subsurface samples at concentrations exceeding LBSVs: 2-butanone, benzene, trichloroethene, benzo(a)anthracene, benzo(a)pyrene,

benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene, antimony, arsenic, cadmium, chromium, lead, nickel, and thallium.

5.4 Quality Assurance/Quality Control Results

The QA/QC sample results were evaluated as part of the data validation process. Data validation reports are provided in **Appendix D**. Validation qualifiers were included in the report tables.

5.5 Waste Characterization Results

Samples of IDW were collected for waste characterization purposes. The waste characterization results are presented in **Tables 7 and 8**. No chemical results exceeded the regulatory criteria for hazardous waste toxicity. The IDW was disposed of as non-hazardous waste.

6.0 Conclusions

WESTON® conducted a Phase II ESA for the Former Fulton Auto Wrecking property, located at 2300 Fulton Road in Cleveland, Cuyahoga County, Ohio. The Site is vacant but future anticipated Site use is residential or mixed use.

The Phase II ESA was conducted at the request and authorization of EPA for Cuyahoga County, Ohio through the TBA grant program. The Phase II ESA was conducted in accordance with OAC 3745-300-07, the *SAP*, dated October 10, 2013, *QAPP*, dated October 2009, and Site-Specific *QAPP Addendum*, dated October 28, 2013 with any deviations noted herein.

The purpose of the Phase II ESA was to investigate the Site for the presence of hazardous substances and petroleum products in environmental media. The Phase II ESA field investigation was conducted in October and November 2013 and included soil sampling and groundwater sampling. Samples of IDW were also collected for waste characterization purposes.

A geophysical survey was conducted to determine if USTs were present in target areas on the Site. The geophysical survey did not identify any metallic objects that could be indicative of a UST in the area of the former filling station. The geophysical survey identified a cylindrical object, which could be indicative of a UST or conductive utility line, in the area south of the former building.

Soil samples were collected from depths ranging from 0 to 29 ft bgs, with most samples collected within the 0 to 10 ft zone. Site soil collected during the Phase II ESA was primarily sand, clayey sand, and sandy gravels. Occasional fragments of brick, rock, wood, and other debris were observed at depths up to 13 ft bgs. Low permeability lenses (stiff silty clay or clayey silt) usually one foot or less in thickness were observed in several borings at depths ranging from 6 to 18 ft bgs. Staining and/or odor was observed in four borings: MW01 (27.5 to 28.5 ft bgs), SB05 (7 ft bgs), SB08 (7 to 10 ft bgs), and SB10 (4 to 7 ft bgs). Soil samples were analyzed for one or more of the following: VOCs, SVOCs, TAL metals, TPH-GRO, TPH-DRO, PCBs, pH, and FOC.

The Ohio VAP direct contact point of compliance for residential (unrestricted) use is to a minimum of 10 ft bgs, but a shallower point of compliance may be applied if the residential use is restricted through appropriate controls. Several PAHs are present in surface and subsurface soil at concentrations exceeding residential GDCSS. Butylbenzylphthalate was detected in surface soil of SB10 at a concentration exceeding the residential GDCSS. Arsenic was detected at concentrations exceeding residential direct contact soil standards in numerous soil samples, but most concentrations were near the background upper limit with the exception of elevated arsenic concentrations reported in SB05 (0 to 2 ft, 2 to 4 ft). Lead was detected in several samples at concentrations exceeding residential GDCSS. Antimony was detected in subsurface soil of SB08 (8 to 10 ft) at a concentration exceeding the residential GDCSS. The cumulative cancer and non-cancer risk ratios for a residential receptor exceed one in the 0 to 2 ft bgs zone, 0 to 4 ft bgs zone, and 0 to 10 ft bgs zone, indicating that remedial measures or further evaluation are needed and the GDCSS must be adjusted for the presence of multiple chemicals.

The Ohio VAP direct contact point of compliance for commercial/industrial use is to a minimum of 2 ft bgs. To accommodate decision making for grade changes that may be needed to prepare the Site for development, soil results within 0 to 4 ft bgs have been compared to commercial/industrial GDCSS. Several PAHs are present in surface and subsurface soil at concentrations exceeding commercial/industrial GDCSS. Butylbenzylphthalate was detected in surface soil of SB10 at a concentration exceeding commercial/industrial GDCSS. Lead was detected in several samples at concentrations exceeding commercial/industrial GDCSS. The cumulative cancer risk ratio for a commercial/industrial receptor exceeds one in the 0 to 2 ft bgs zone and 0 to 4 ft bgs zone, indicating that remedial measures or further evaluation are needed and the GDCSS must be adjusted for the presence of multiple chemicals.

The Ohio VAP direct contact point of compliance for construction workers is to the maximum anticipated depth of excavation during construction and infrastructure placement or repair, typically to 10 ft bgs. Several PAHs were detected in SB11 (2 to 4 ft) at a concentration exceeding the construction worker GDCSS. Butylbenzylphthalate was detected in surface soil of SB10 at a concentration exceeding the construction worker GDCSS. 1,2,4-Trimethylbenzene was detected in MW02 (2 to 4 feet) at a concentration exceeding the construction worker GDCSS. Lead was detected in several samples at concentrations the construction worker GDCSS. The cumulative cancer and non-cancer risk ratios for a construction worker exceed one for the 0 to 10 ft bgs zone, indicating that remedial measures or further evaluation are needed and the GDCSS must be adjusted for the presence of multiple chemicals.

In addition, TPH was detected in SB08 (8 to 10 ft) and SB11 (2 to 4 ft) at concentrations exceeding the residual saturation levels (i.e. BUSTR action levels). The BUSTR action levels are used by the Ohio VAP as applicable standards for TPH identified within the points of compliance.

Groundwater samples were collected and analyzed for VOCs, SVOCs, and metals. No COCs were detected in the groundwater at concentrations exceeding UPUS. Groundwater flow was determined to be in a east-southeast direction.

Because groundwater meets UPUS, provisions for protecting the groundwater quality apply to the vadose zone soil. As a screening level evaluation, soil sampling results within the vadose zone were compared to generic LBSVs. COCs were detected in surface and subsurface samples at concentrations exceeding LBSVs, including 2-butanone, benzene, trichloroethene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene, antimony, arsenic, cadmium, chromium, lead, nickel, and thallium. Leaching potential is highly dependent on a number of Site-specific factors including FOC content, soil pH, clay content, hydraulic conductivity, etc. Generic LBSVs are conservative in order to be protective in most geologic conditions typical for Ohio. Site-Specific LBSVs, which are often less conservative, can be developed as part of a Property-Specific Risk Assessment but this was beyond the scope of the Phase II ESA.

Volatile compounds were detected in the soil and thus evaluation of vapor intrusion risk is warranted prior to construction of any enclosed-space buildings on the Site. Generic vapor intrusion screening levels for bulk soil are not available in the Ohio VAP rules. Johnson and

Ettinger modeling may be conducted to determine if volatile compounds detected in soil could present a risk of vapor intrusion to indoor air. If potential vapor intrusion risk is identified, further evaluation through collection of soil gas samples or remediation such as mitigation of the risk is necessary to proceed with the voluntary action. Johnson and Ettinger modeling is beyond the scope of the Phase II ESA and would typically be conducted as part of a Property-Specific Risk Assessment.

In summary, the Site does not meet applicable standards under the Ohio VAP for residential use (unrestricted or restricted), commercial/industrial use, or for protection of construction workers. Applicable standards were exceeded for the direct contact with soil and leaching pathways. Generic standards are not available for all COCs and complete or potentially complete pathways, thereby warranting a Property-Specific Risk Assessment. Further evaluation and/or remedial measures are warranted to proceed with the voluntary action on the Site.

7.0 References

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